

A STUDY TO ESTABLISH A DEGRADATION PROFILE
FOR DISLODGEABLE PROPARGITE RESIDUE ON
GRAPE LEAF FOLIAGE IN KERN COUNTY
CALIFORNIA DURING JULY 1985

by

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SUMMARY

Two grape vineyards in Kern County were sampled for dislodgeable foliar pesticide residue after applications of propargite (Omite). Two application rates were used; 2 and 3 pounds active ingredient per acre. Samples were collected before the application and for eight consecutive days following the application. The reentry interval for propargite on grapes was 7 days when this study was conducted. Detectable levels of material were present after the expiration of the reentry interval. At the time of the study, no safe foliar residue level had been established for propargite.

INTRODUCTION

In June 1971, the California Department of Food and Agriculture (CDFA) established reentry intervals for specific crop/pesticide combinations. A reentry interval is the time period that must elapse between the application of a pesticide and the entry of unprotected workers into the treated area. This waiting period was instituted to allow sufficient time for toxic materials to environmentally degrade to a negligibly hazardous level of toxicity. The adequacy of these reentry intervals is under continual evaluation.

Since the introduction of the fungicide triadimefon (Bayleton) in 1983, the number of sulfur-related skin rashes has decreased. However, the total number of rashes due to workers' exposure to pesticide residues in the field has not decreased. Propargite [2-(4-(1,1 dimethylethyl)phenoxy) cyclohexyl-2-propynyl sulfite], a Toxicity Category I acaricide, is a possible factor in skin rash occurrences. Because excessive dermal exposure to propargite is suspected to cause severe rashes, even chemical burns, this material has a seven day reentry interval on grapes. The dermal LD₅₀ <rabbit> is over 10,000 mg/kg (1). The purpose of this study was to monitor the foliar degradation rate of dislodgeable propargite residue and to verify the adequacy of the seven day reentry interval. CDFA had not yet established a safe residue level for propargite when this study was conducted.

METHODS AND MATERIALS

With assistance from the Kern County Agricultural Commissioners' office, cooperation was obtained from a grower who would be using propargite on grapes. The material used was Omite 30W. (EPA Reg. # 00400-00082 AA), registered by Uniroyal Chemical. This material contains 30% active ingredient in a wettable powder formulation. The grower selected two blocks in central Kern County and used different application rates on each block: 6 and 9 pounds of formulated product per acre. This is equivalent to 2 and 3 pounds of active ingredient per acre, respectively. The dilution rate for both applications was 40 gallons of water per acre. The material was applied by a ground rig using an over vine boom sprayer, which delivers material over two adjacent rows. The reentry interval for these applications was 7 days.

Each of the two blocks was divided into three sections. A row from the center of each section was selected as the sampling row. Rows A, B, and C formed one sampling diagonal; Rows D, E, and F formed the second (See Figure 1). Twenty leaf punches were taken from each row, ten punches from the left side of the row and ten from the right side. The 60 leaf punches collected from each sampling diagonal were accumulated in one bottle. Duplicate samples were obtained simultaneously from sites spaced as close together as possible, preferably from the same leaf. This sampling scheme was followed on both blocks. Since there were two sample diagonals per block, each block generated four jars of samples.

Each sample was punched from a leaf approximately one meter above the ground, with sample sites approximately one meter apart. Punches were taken from leaves presenting the greatest exposed surface area.

Pre-application samples were collected the day before the application. Post-application samples were taken within 2 hours of application. Subsequent samples were taken at 24 hours, 48 hours, 3, 4, 5, 6, 7 and 8 days post-application.

Samples were taken using a Birkstrand 2.54 cm. diameter leaf punch. Each sample contained 60 leaf punch discs accumulated in a four ounce glass jar. The leaf punch was cleaned with isopropyl alcohol (70%, standard grade) between row samplings. Samples jars were sealed with aluminum foil (food grade), capped and stored on wet ice. The ice was constantly replenished to ensure a temperature range of 4°-5°C.

Samples were shipped by common carrier to the Department's Chemistry Laboratory Services in Sacramento for analysis. Dislodgeable residue was removed by rotating the leaf discs in a water-surfactant solution. The aqueous phase was extracted with methylene chloride, dried in a roto-evaporator, concentrated or diluted as necessary, then analyzed on a Varian 6000 FPD in sulfur mode. Method sensitivity was 8 ug/sample. Weather conditions during the study were hot with no rain in the study area. Temperature ranged from 10°C to 42°C for the 8 days of the study.

RESULTS

The analytical results for the dislodgeable propargite residue levels are shown in Tables One and Two. The actual residue value for each sample bottle is given in the first four columns; the fifth column is the mean value of all four. All values are expressed in micrograms per square centimeter (ug/cm²).

DISCUSSION

Under the conditions of this study, average dislodgeable residues of propargite applied at 2 lbs/acre remained at a fairly stable level for 6 days; on day 7 the residue level dropped by 50%. However, the residue levels of the 3 lbs/acre application showed considerable fluctuation with no discernible degradation pattern. Environmental conditions do not explain this anomalous behavior of the 3 lb. rate compared to the 2 lb. rate since the two blocks were adjacent to each other and treated at the same time. Sample collection, shipping and storage at the field level, and presumably at the analytical level, were identical. This study does indicate a possible exposure potential after the expiration of a 7-day reentry interval for people involved in work that results in substantial and prolonged dermal contact with the foliage.

Figure One
Sampling Diagram

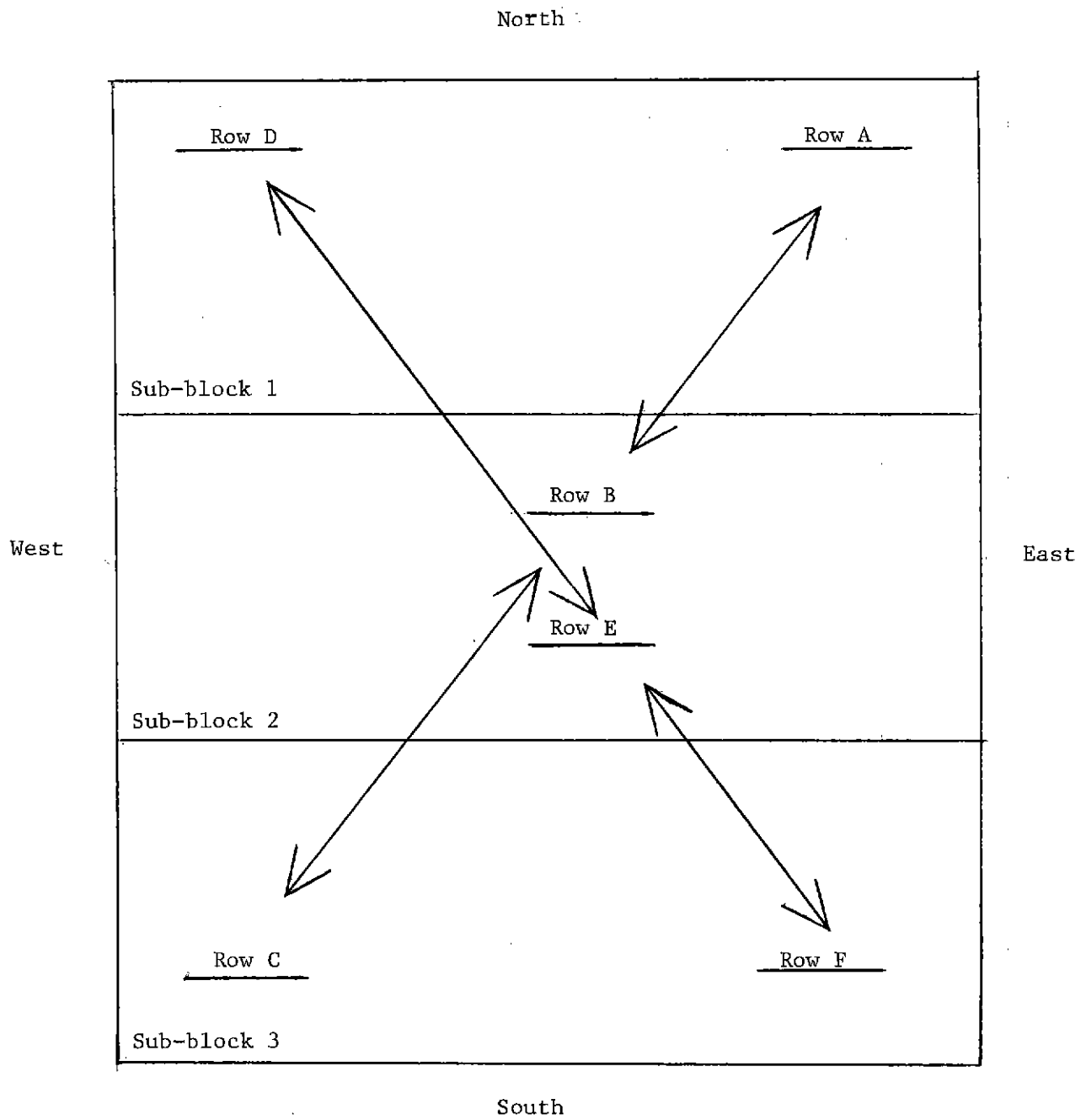


TABLE ONE

SAMPLE RESULTS OF
PROPARGITE DISLODGEABLE RESIDUE
2 POUNDS PER ACRE
(ug/cm²)

<u>Time After Application</u>	<u>Primary Diagonal (Rows A, B, and C)</u>		<u>Secondary Diagonal (Rows D, E, and F)</u>		<u>Average</u>
Pre-application	ND	ND	ND	ND	ND
2 hour	0.14	0.12	0.12	0.15	0.13
24 hour	0.16	0.13	0.15	0.10	0.14
48 hour	0.11	0.11	0.16	0.085	0.116
72 hour	0.093	0.11	0.17	0.072	0.111
4 day	0.29*	0.12	0.017	0.055	0.121
5 day	0.056	0.14	0.13	0.12	0.112
6 day	0.20	0.14	0.10	0.11	0.138
7 day	0.062	0.079	0.06	0.064	0.066
8 day	0.077	no samp.	0.051	0.051	0.061

Minimum Detectable Level = 8 ug/sample (approximately 0.03 ug/cm²)

*Highest detected value

ND - None detected

TABLE TWO

SAMPLE RESULTS OF
PROPARGITE DISLODGEABLE RESIDUE
3 POUNDS PER ACRE
(ug/cm²)

<u>Time After Application</u>	<u>Primary Diagonal (Rows A, B, and C)</u>		<u>Secondary Diagonal (Rows D, E, and F)</u>		<u>Average</u>
Pre-application	none detected				
2 hour post.	0.34	0.64	0.22	0.18	0.345
24 hour post.	0.52	0.25	0.092	0.11	0.243
48 hour post.	0.11	0.11	0.047	0.068	0.084
72 hour post.	0.78*	0.49	0.25	0.20	0.430
4 day post.	0.14	0.29	0.19	0.12	0.185
5 day post.	0.45	0.45	0.19	0.13	0.305
6 day post.	0.66	0.82	0.23	0.13	0.460
7 day post.	0.33	0.26	0.13	0.11	0.208
8 day post.	0.27	0.40	0.15	0.10	0.230

Minimum Detectable Level = 8 ug/sample (approximately 0.02 ug/cm²)

*Highest detected value

REFERENCES

1. Hayes, Wayland J.: Pesticides Studies in Man. pg. 624 Williams & Wilkins, publ. (1982)